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(54) **THERMOMECHANICAL IN-PLANE MICROACTUATOR**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(57) **ABSTRACT**

(51) **Int. Cl.**⁷ **H02N 10/00**; H01N 41/00;
H01N 47/00

A microactuator providing an output force and displacement in response to an increase in thermal energy is disclosed. The microactuator may have a substantially straight expansion member with a first and a second end. The first end may be coupled to a base member, and the second end may be coupled to a shuttle. The expansion member is capable of elongating in a elongation direction. Elongation of the expansion member may urge the shuttle to translate in an output direction substantially different than the elongation direction. In certain embodiments, multiple expansion members are arrayed along one side of the shuttle to drive the shuttle against a surface. Alternatively, expansion members may be disposed on both sides of the shuttle to provide balanced output force. If desired, multiple microactuators may be linked together to multiply the output displacement and/or output force.

(52) **U.S. Cl.** **310/306**; 310/307

(58) **Field of Search** 310/306, 307,
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294.6

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46 Claims, 6 Drawing Sheets

